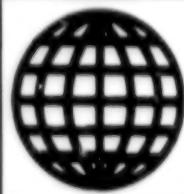


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# ***JPRS Report—***

# **Science & Technology**

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***USSR: Life Sciences***

# Science & Technology

## USSR: Life Sciences

JPRS-ULS-91-003

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10 January 1991

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UDC 632.95.633.11

### Effect of Elements of Intensive Farming Technology on Complex of Winter Wheat Diseases in GSSR

907C0528A Tbilisi SOOBSHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 136 No 1, Oct 89 (manuscript received 26 May 88) pp 149-152

[Article by L. V. Paychadze, A. M. Dymchenko, T. P. Zhokhova, L. N. Nazarova, and A. P. Orletskaya, Georgian Branch of the All-Union Scientific Research Institute of Phytopathology]

[Abstract] Systems for the industrial cultivation of wheat are being developed for and introduced in various regions of the country. Some 41 million hectares of land were used in the USSR in 1987 for the industrial cultivation of wheat. Such intensive cultivation involves a series of agricultural techniques that produce large, stable harvests. Although the GSSR is not known as a wheat-growing region, some 180,000 hectares of wheat are grown here, consisting primarily of three varieties: Kavkaz, Bezostaya 1, and Deda, whose harvests reach 20-25 cwt/ha. The researchers here sought to study the effect of modern agricultural techniques on the development of a complex of winter wheat diseases in order to determine the feasibility of growing certain foreign varieties of wheat (Caribo, Fidel, Skaut, Armada, Avalon, and Mironovskaya 808) in the GSSR. Their studies, performed in Borzhomskiy Rayon, involved various aspects of intensive farming (tilling, fertilizer application, top dressing, etc.) and included spraying the plants with preparations such as Bayloton and tilt. Artificial infection with fungal diseases was used to test the plants and the effectiveness of fungicides. The use of fungicides on the various varieties increased wheat production by an average of 20 cwt/ha. References 7: 2 Russian, 5 Western.

UDC 578.864.1:57.086.835

### Maintaining Y Potato Virus in Nicotiana Glutinosa Callous Tissue Culture

907C0502A Moscow DOKLADY VSESOFIYUZNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V.I. LENINA in Russian No 11, Nov 89 (manuscript received 7 Mar 89) pp 8-11

[Article by N. A. Timoshenko, V. A. Bnuchkova, V. K. Vishnichenko, and S. K. Zavriyev, All-Union Scientific Research Institute of Agricultural Biotechnology]

[Abstract] The feasibility of maintaining and accumulating YBK potato virus in the callous tissues of *Nicotiana glutinosa* was studied. The plants were inoculated

at the three-leaf stage with a purified preparation of YBK. The "sandwich-method" of enzyme immunoassay was used to determine the virus antigen in plants and callous tissues. As a result of the research conducted, the best composition of the medium for planting the explants, for producing a virus-containing callous, and for transplanting it was developed. The formation of callous tissue was observed in 90 percent of the cultures 2-3 weeks after planting the explants. There was a large number of virions with a morphology typical of potato viruses on the callous tissue obtained from the infected plants. Fragments of cytoplasmic inclusions that were always found in the preparations similarly obtained from the *N. glutinosa* leaves infected with YBK were not found in any of the preparations researched. The antigen to the cytoplasmic inclusions was not found either. These results probably reflect the specific functions of the proteins of the cytoplasmic inclusions in the transport processes of potato virus infections in contaminated plants from cell to cell. The results prove the feasibility of the long-term persistence and accumulation of YBK infections in a culture of *N. glutinosa* callous tissue. This model is suggested for solving a number of problems of phytopathology. Figures 3, references 10: 4 Russian, 6 Western.

UDC 635.656:631.528

### Sensitivity and Mutability of Genotypes of Nonshattering Pea After Exposure to Ionizing and Laser Radiation

907C0502B Moscow DOKLADY VSESOFIYUZNOY ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI AKADEMII SELSKOKHOZYAYSTVENNYKH NAUK IMENI V.I. LENINA in Russian No 11, Nov 89 (manuscript received 7 Mar 89) pp 12-14

[Article by A. M. Shevchenko (corresponding member of the All-Union Academy of Agricultural Sciences), O. V. Blyandur, and S. K. Kirilenko, Voroshilovgrad Scientific Production Association Elita]

[Abstract] The genetic effects of laser radiation as compared with ionizing radiation and their combined effect on the seeds of genetically contrasting varieties of nonshattering pea—Truzhenik and Usach intensive—were studied. The air-dried seeds of those varieties were exposed to gamma and laser radiation. Both varieties reacted identically to gamma-irradiation. In most instances, an increase in the germination of seeds and a decrease in the survivability of plants were noted. Analysis of the results indicated that gamma and laser irradiation induced chlorophyll and morphophysiological changes. All types and levels of irradiation evoked more chlorophyll and morphophysiological changes in Truzhenik than in the Usach intensive. Treating the seeds with laser and preliminary gamma irradiation caused physiological disturbances of delaying maturation or blooming. References 8: 7 Russian, 1 Western.

UDC 577.153.4:661.718.1

**Comparative Study of Effect of Esters of Vinyl Phosphoric Acid on Activity of Cholinesterase and Carboxylesterase in Mammals and Arthropods**

907C0587 Leningrad ZHURNAL  
EVOLYUTSIONNOY BIOKhimii I FIZIOLOGII  
in Russian Vol 26 No 1, Jan-Feb 90 (manuscript  
received 25 Jan 89) pp 30-34

[Article by L. I. Kugusheva, V. I. Rozengart, L. Ya. Kozenasheva, and V. A. Kolesova, Institute of Evolutionary Physiology and Biochemistry imeni I. M. Sechenov of the USSR Academy of Sciences; Moscow Chemical Engineering Institute imeni D. I. Mendeleyev]

[Abstract] *Nc,N* unsaturated organophosphoric inhibitors—esters of vinyl phosphoric acid—were synthesized, and their ability to inhibit cholinesterase and carboxylesterase activity in mammals and arthropods was

studied. Dialkyl esters of thio-(1-methyl-2-ethoxycarbonyl) vinyl phosphoric acid were synthesized. Homogenates of various cholinesterase and carboxylesterase sources were prepared. Mammalian cholinesterase was more sensitive to the first group of the series studied than most of the arthropods were. The sensitivity of various members of the *Tetranychoidea* superfamily to the substances studied was identical. Differences were observed only for the isobutyl derivative. The main mechanisms observed for cholinesterase are also seen in carboxylesterase, demonstrating similarity in the structure of the catalytic surface near the esterase center of both enzymes. The specific differences in cholinesterase and carboxylesterase between mammals and most species of arthropods are very significant. A more marked role of the hydrophobic environment of the esterase point of the arthropod cholinesterase and carboxylesterase active sites in comparison with mammalian enzymes is noted. References 10: 8 Russian, 2 Western.

UDC 577.3

**Photosensitized Formation and Quenching of Singlet Molecular Oxygen by Monomeric and Aggregated Molecules of Pigments of Photosynthesizing Bacteria**

907C0431B Moscow DOKLADY AKADEMII NAUK  
in Russian Vol 310 No 2, Jan 90 pp 471-475

[Article by S. Yu. Yegorov, A. A. Krasnovskiy, Jr., I. V. Vychevzhanina, N. N. Dorzdova, and Academician A. A. Krasnovskiy, Moscow State University imeni M. V. Lomonosov; Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences, Moscow]

[Abstract] Oxygen molecules in a singlet state ( ${}^1\text{O}_2$ ) play an important role in photodynamic injury of cells, especially in processes which determine photodynamic (laser) therapy of cancer. It was shown previously that monomeric molecules of pigments of photosynthesizing bacteria, bacteriochlorophylls and bacteriopheophites having intense absorption bands in the near-IR can effectively photosensitize formation of  ${}^1\text{O}_2$  in organic solvents saturated with air. Unexcited molecules of pigments actively quench singlet oxygen, producing physical deactivation of  ${}^1\text{O}_2$  and destruction of photosensitizers, reducing the effectiveness of their photodynamic effect. This paper describes a study of processes of photogeneration and quenching of  ${}^1\text{O}_2$  in organic media and aqueous solutions, modelling basic types of intermolecular interactions of pigmented molecules in live cells.

Incorporation of pigments into aqueous micellar solutions of detergent, different types of solvation for the central magnesium atom and association of the pigmented molecules served as an example of such interaction. A pulsed laser phosphorimeter measured luminescence of  ${}^1\text{O}_2$ . Comparison of the luminescence intensity of  ${}^1\text{O}_2$  in a solution of the pigment studied and in a standard solution revealed absolute values of quantum yields of generation of  ${}^1\text{O}_2$ . Illumination of solutions of the pigments by nitrogen laser pulses showed luminescence with a peak of about 1270 nm. The lifetime of the luminescence at low concentrations of sensitizers was 34  $\mu\text{s}$  in diethyl ether, 11  $\mu\text{s}$  in pyridine, 35  $\mu\text{s}$  in aqueous detergents and about 60  $\mu\text{s}$  in  $\text{D}_2\text{O}$  with 5 percent ethanol. Monomeric molecules of bacterial photosynthetic pigments proved to be effective IR-sensitizers of  ${}^1\text{O}_2$  formation both in organic solvents and in heterogenic micellar solutions, which can be assumed to be a molecular model of the cell membranes. Quenching of  ${}^1\text{O}_2$  by unexcited molecules of the pigments was highly effective. Twofold quenching of  $\tau_0$  by bacteriochlorophylls in ether and pyridine occurred at a concentration of  $3.5 \times 10^{-4}$  M and it occurred in live cells at a concentration of more than  $3 \times 10^{-2}$  M. That equals the content of pigments of bacteria in the photosynthetic apparatus and considerably exceeds the concentration of sensitizers used in photodynamic therapy. Bacterial pigments are an extremely promising group of sensitizers for phototherapy. Figures 3; references 14: 7 Russian; 7 Western.

UDC 581.1:577.472:576.8

### Features of Development of Accumulation Culture of Green Algae in 'Biosolyar' System

907C0588 Moscow BIOLOGICHESKIYE NAUKI  
in Russian No 1, Jan 90 (manuscript received  
2 Nov 1987) pp 75-81

[Article by L. A. Granovskaya, M. M. Telitchenko, and Ye. L. Shirokova, Department of Hydrobiology, Moscow State University imeni M. V. Lomonosov]

[Abstract] In connection with the broad use of accumulation cultures in bioengineering, research of the mechanisms of their development is very urgent. Autotrophic cultures of algae release soluble organic substances that affect the physico-chemical characteristics of the culture medium. Extremely toxic hydroperoxides, peroxides, and free radicals arise as a result of peroxidation of soluble organic substances. The malonic dialdehyde that forms as a result of oxidizing unsaturated macromolecular fatty acids yields 2-thiobarbituric acid and a trimethyl complex. Use of a test reaction with 2-thiobarbituric acid makes it possible to assess the potential ability of soluble organic substances to oxidize, which makes it possible to judge the stability of the hydroecosystem and

quality of water in the reservoir. The informativeness of the 2-thiobarbituric acid test was calculated using filtrates of a green alga *Chlorella pyrenoidosa* Chik. cultured in glass bottles in acidic and alkaline environments. In the development process of *Chlorella* that is in the acidic environment, the pH continuously rises. The concentration of malonic dialdehyde also increases. In the alkaline environment the algae develop poorly. The pH does not change, while the malonic dialdehyde concentration rises continually. The intensity of accumulating the oxidized products in the culture may be used to judge its suitability for obtaining the maximum yield of algae production. "Biosolyar" converts solar energy into chemical energy by bioconversion. "Biosolyar" is a semi-industrial device consisting of three units—a photosynthesis unit, sedimentation tank, and a methane tank. The *Chlorella* achieved maximum growth in a culture with 200 mg/l of nitrogen, 50 mg/l of phosphorus, and malonic dialdehyde concentration of less than 20 nM. An increase in the concentration of soluble organic substances, its destruction by enzymatic and physicochemical oxidation, and the accumulation in the environment of a large amount of product of peroxidation inhibit the growth and development of the microalgae and reduce their productivity. References 7 (Russian).

UDC 574.5:551.46.06

**Microbial Transformation of Polychlorinated Biphenyls in Polar Sea Regions**

907C0431D Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 310 No 2, Jan 90 pp 502-506

[Article by Yu. A. Izrael, corresponding member USSR Academy of Sciences, A. V. Tsyban, G. V. Panov and S. M. Chernyak, Environment and Climate Monitoring Laboratory, Moscow]

[Abstract] A study of the capacity of marine microflora to transform polychlorinated biphenyls in polar regions of the World Ocean continued in the form of research involving biogeochemical cycles of polychlorinated biphenyls that was begun in 1984 during the 2nd Soviet-American combined ecological expedition in the Bering Sea and was continued in the 3rd Soviet-American combined ecological expedition in the Bering Sea, the Sea of Chukot and the central Pacific Ocean aboard the

r/v *Akademik Korolev*. Experiments conducted in the summer of 1988 to assess the rate of transformation of polychlorinated biphenyls by Bering Sea and Sea of Chukot bacterioplankton at 2-10°C produced fundamentally new data, showing that, in polar regions of the ocean, only lowly-chlorinated biphenyls (dichlorophenols and hexachlorophenols) undergo active bacterial degradation. It was found that many of those compounds disintegrate partially or are transformed into other substances which also may be dangerous for marine biota. Highly-chlorinated biphenyls are highly resistant to marine microorganisms; they accumulate in components of ecosystems and circulate in the marine environment for many decades. The study confirmed the great ecological danger of contamination, by chlorinated carbohydrates, of polar regions of the World Ocean, where microbial transformation of xenobiotics proceed slowly at the low temperatures and there are practically no processes of disintegration. References 13: 11 Russian; 2 Western.

UDC 616.831.9-002.1-022.7-078(574-25)

**Etiological Structure of Acute Meningitis in Alma-Ata**

907C574E Moscow *ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII* in Russian  
No 12, Dec 89 (manuscript received 29 Nov 88)  
pp 109-110

[Article by M. S. Bayzhomartov, N. N. Kostyukova, K. T. Uspanova, O. G. Stetsenko, S. F. Daulbayeva, O. I. Belenko, and N. V. Roshchina, Alma-Ata Scientific Research Institute of Epidemiology, Microbiology, and Infectious Diseases of the Kazakh Socialist Soviet Republic Ministry of Health; Scientific Research Institute of Epidemiology and Microbiology imeni N.F. Gamaleya of the USSR Academy of Medical Sciences]

[Abstract] The etiological structure of acute meningitis in Alma-Ata in 1985-1986, when morbidity with meningococcal infection was above the threshold level, was studied in the first such research conducted in that area. In all, 561 patients diagnosed with acute meningitis were screened—467 children and 94 adults. Passive hemagglutination test and bacterioscopy of the cerebrospinal fluid and blood of patients are of the most value diagnostically for determining the etiology of acute purulent meningitis. The use of EIA and bacterioscopy makes it possible to increase the frequency of deciphered cases of serous meningitis by determining the etiological participation of bacterial causative agents as well as viruses. Meningococcal infections tied primarily to meningococci of serogroup A dominated in the etiological structure of acute purulent meningitis in Alma-Ata in 1985-1986, though meningococci of serogroups B, C, and Y were also in circulation. The number of acute purulent meningitis that are etiologically undeciphered remains high. The possible etiological participation of meningococci, pneumococci, and *Mycoplasma pneumoniae*, adenoviruses, etc., in the development of acute serous meningitis was established.

UDC 616.61/.62+616.64/.68]-006.04:313.13

**Statistics of Malignant Tumors in Urinary and Male Sex Organs in 1987 in USSR**

907C0589A Moscow *UROLOGIYA I NEFROLOGIYA* in Russian No 1, Jan-Feb 90 pp 42-45

[Article by V. V. Dvoyrin, V. P. Matveyev, Ye. M. Aksel, and S. F. Zobnina, All-Union Oncological Scientific Center of the USSR Academy of Medical Sciences]

[Abstract] Of all the deaths in 1987 due to malignant tumors, 5.7 percent were attributed to cancerous urological tumors. From 1975 through 1987, the number of people who died from malignant tumors of the urinary system grew by over 54 percent; the number of those who died from tumors of the prostate gland grew by 64 percent; and the number of those who died from tumors

of other male sex organs increased by 50 percent. Men die from malignant tumors of the urinary tract 4.3 times more often than women. The number of new cases of prostate cancer diagnosed annually is 10,000, while the number of new cases of cancer of the urinary bladder is 15,000. There has been a considerable increase in morbidity associated with malignant tumors of the urinary and male sex organs. The number of late diagnoses of the diseases is especially alarming. Reasons for late diagnoses are the poor organization of oncurology service and lack of equipment available to the specialists.

UDC 616.98:579.861]-036.2-07(47+57)

**Epidemiological Features of Meningococcal Infection in USSR**

907C0574A Moscow *ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII* in Russian  
No 12, Dec 89 (manuscript received 4 Jan 89) pp 36-40

[Article by N. P. Devyatina, A. A. Demina, and A. V. Pichushkov, Central Scientific Research Institute of Epidemiology of the USSR Ministry of Health, GUKI [as published] of the USSR Ministry of Health]

[Abstract] Certain changes that have occurred in recent years in the dynamics of the epidemic process of meningococcal infection are analyzed in this study. Two rises in meningococcal infection morbidity have been recorded since 1969. Morbidity during 1972 and 1984, the years of the rises, was 9.2 and 7.45 cases per 100,000. The lowest figure was noted in 1979—5.46/100,000. Two rises were also recorded for that period in the RSFSR, UkrSSR, KaSSR, LaSSR, and TaSSR. Belarusia, Lithuania, Kirgiziya, and Estonia had three rises. Four rises were recorded in Moldavia. One rise was noted for the period in question in UzSSR, GSSR, and TuSSR. No rises were recorded for ArSSR or AzSSR. Since 1985, the morbidity associated with meningococcal infection has been decreasing, which may reflect the natural course of the epidemic process, but may also be due to specific vaccination. Lethality of 6.9 percent was noted in 1972 and increased until 1984, when it reached 13.4 percent. Most cases of the disease involved children under one year of age. In 1985-1986, half of the cases of the illness were caused by meningococcus serogroup B. Analysis showed that in the infection foci, the level of meningococcal carriage fluctuates from 0.8 to 17.4 percent. There has been a high level of carriage (4-8 percent) in recent years in Leningrad, Novosibirsk, Kharkov, and Yaroslavl. Anti-epidemic measures are being conducted against meningococcal infection in accordance with instructions set forth in 1983. A polysaccharide meningococcus group A vaccine has been introduced for administration to all those one year of age or older who have had contact with victims. Figures 4, references 7: 6 Russian, 1 Western.

UDC 616.98:579.842.14].036.21-07(470.311-25)

### Manifestations of Epidemic Process of Typhoid Infection in Moscow

907C0574B Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLGOII in Russian No 12, Dec 89 (manuscript received 10 Feb 89) pp 40-45

[Article by S. L. Kolpakov, T. S. Kozyreva, First Moscow Medical Institute imeni I. M. Sechenov; Moscow City Anti-Epidemic Station]

[Abstract] In the Soviet Union, typhoid morbidity averages 6-7 cases per 100,000 population per year, occurring with less frequency in Belorussia, the Ukraine, the Baltic states, and the eastern part of the Russian Soviet Federated Socialist Republic, and with more frequency in Central Asia, the Transcaucasus, and Western Siberia. The features of the epidemic process of typhoid fever need to be studied for the various republics as well as for the country as a whole. Morbidity associated with typhoid fever in Moscow for 1980-1988 was analyzed and was shown to fluctuate from 0.17 to 0.98 cases per 100,000 in Moscow. Over one-half of the cases in Moscow involve people infected outside of the city. Most of the typhoid fever cases that are contracted outside the city occur in June through October, when many people take their vacations and contract the disease. The local cases, on the other hand, are recorded in isolated instances all year long. From 1980 to 1988, 78 percent of the chronic bacteria carriers were found to have the typhoid fever bacteria. Figures 3, references 16: 7 Russian, 9 Western.

UDC 616.931-036.2-07

### Features of Present Course of Epidemic Process of Dysentery Infection

907C0498B Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 11, Nov 89 (manuscript received 28 Feb 89) pp 13-15

[Article by L. I. Bardina, L. V. Yeliseyeva, R. I. Stepanenko, and A. G. Moroz, Belorussian Scientific Research Institute of Epidemiology and Microbiology, Republic Center for Hygiene and Epidemiology]

[Abstract] The features of the morbidity and bacteria carriage of diphtheria in the republic were studied, and

ways of suppressing the epidemic process to prevent an elevation in the morbidity level were determined. Universal circulation of toxigenic strains of *Corynebacterium* in the form of asymptomatic carriage and sporadic clinical manifestations of diphtheria are characteristic of the epidemic process. Epidemiological, clinical, and bacteriological data were studied for the years 1979-1987. Most of the diphtheria patients were adults, and most cases of the disease occur during the months of June, October, and November. There were more than three-fold more cases in urban areas, and women were twice as likely as men to contract the disease. A biochemical variant of mild *Corynebacterium* is the causative agent. Four percent of the cases resulted in death. Anti-diphtheria sera were administered to 65 percent of the patients. More than one-half of the patients did not have documented confirmation of vaccination against diphtheria. Eleven percent were not immunized. Figures 4, references 3 (Russian).

UDC 616.36-002

### Study of Carriers of Hepatitis B Virus Markers Among Pregnant Women in Turkmen SSR

907C0497C Ashkhabad ZDRAVOOKHRANENIYE TURKMENISTANA in Russian No 10, Oct 89 pp 29-31

[Article by V. G. Sadykov, I. Yu. Gasanov, A. A. Asratyan, and L. K. Kozhevnikova, Department of Infectious Diseases and Epidemiology, Turkmen Order of Friendship of Peoples State Medical Institute; Ashkhabad Scientific Research Institute of Epidemiology and Hygiene imeni S. M. Dursunova]

[Abstract] Previous research in the Turkmen and Uzbek republics showed that pregnant women were 1.5 times more likely to have the hepatitis B surface antigen than other women, thereby serving as a source of viral hepatitis B to their families and those with whom they come in contact during medical examinations and childbirth. Because of the high level of morbidity in Turkmen SSR with viral hepatitis B and the large number of pregnant women, the researchers here studied that group for carriage of certain viral hepatitis B markers. The sera of 380 pregnant women were examined for HBsAg and anti-HBS via enzyme immunoassay. Viral hepatitis B markers were found 1.7 times more often in pregnant women, indicating that they are at an increased risk of infection and are, indeed, an epidemically significant source of viral hepatitis B. References 5 (Russian).

UDC 571.1

**Observed Genetic Effects in Experiments With Drosophila After Exposure to Weightlessness**  
90°C0431A Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 310 No 2 Jan 90 pp 468-470

[Article by L. P. Filatova, E. N. Vaulina, N. Sh. Lapteva and T. Ya. Grozdova, Institute of General Genetics imeni N. I. Vavilova, USSR Academy of Sciences, Moscow]

[Abstract] Since the level of recombination variability ensuing in the course of evolution is, evidently, optimal, any large decrease or increase may be undesirable. A study of the effect of flight conditions on the rate of recombination variability is necessary in order to predict remote effects of a prolonged stay in outer space. This study of the effect of space flight factors on the frequency of recombination of *Drosophila melanogaster* included a study of the effect of a changed force of gravity during centrifuging and clinostating on the recombination process in *drosophila* which makes it possible to model

dynamic factors of flight. The experiment involved male *D. melanogaster* that were from a line with *mei-9<sup>L1</sup>* in the X-chromosome, which blocks excision repair, and that were heterozygous for genes *b*, *pr*, *cn* and *en*, situated in chromosome 2 on both sides of the centromere in the region near the centromere. Males (3-4 days old at the time of flight) were placed on a 7-day flight aboard Kosmos-1667 (1985) and a 13-day flight aboard Kosmos-1887 (1979). In simulated experiment, acceleration on a centrifuge was 6-8g in one version and 2g in another. Clinostating continued for 7 and 13 days at a rate of rotation of 5 rev/min. A statistically significant lower frequency of recombinations in chromosomes by comparison with the control occurred as a result of factors of space flight. Centrifuging produced a negligible increase in frequency of recombination that, to some extent, was proportional to the increase in the force of gravity. Clinostating also produced a very insignificant increase of frequency of recombination. The effect of vibration was insignificant. The effect of heavy charged particles did not appear to be a major factor in the flight effect observed. References 14: 6 Russian; 8 Western.

UDC 616.155.392-036.11-085.362.438.017:615.275.4-  
036.8 612.017.1.063

### Study of Immunostimulating Effect of Tactivin in Acute Leukemia

907C0540B Moscow IMMUNOLOGIYA in Russian  
No 6, Nov-Dec 89 (manuscript received 19 Jan 89)  
pp 70-71

[Article by V. A. Shalayev, S. I. Kuklin, and O. G. Makayev, Sverdlovsk Medical Institute]

[Abstract] The effect of tactivin on restoring immune system activity was studied in 23 cases of cytostatic agranulocytosis in the acute phase and remission of acute leukemia. Patients in whom agranulocytosis was accompanied by infectious complications were administered tactivin once a day for 7-10 days. After treatment with tactivin, the content by percent of T-lymphocytes and B-cells increased. The use of tactivin improves the immune system activity in patients with cytostatic agranulocytosis in the acute phase and remission of acute leukemia and helps reduce the period of agranulocytosis in those patients. The use of tactivin is effective after successful cytostatic therapy, which prepares the way for restoring normal hemopoiesis. References 5: 3 Russian, 2 Western.

UDC 616-006.81.04-018.15-02:616.155.33-  
008.13-02:615.275.4:547.95

### Regulatory Effect of Myelopid on Macrophage Effector Function and Melanoma B16 Growth

907C0540A Moscow IMMUNOLOGIYA in Russian  
No 6, Nov-Dec 89 (manuscript received 13 Jun 88)  
pp 45-47

[Article by K. Z. Kurbanov, Ye. V. Sokolova, L. V. Kovalchuk, and R. V. Petrov, Second Moscow Medical Institute imeni N. I. Pirogov]

[Abstract] Based on the cyclic changes in immune system indices, the researchers studied the direct cytotoxic and tumor-neutralizing activity of macrophages in mice with melanoma B16. They used a new immunomodulator—myelopid (Vaktivin)—to regulate the activity of the macrophage component. C57BL/6 mice that had received transplants of melanoma B16 were sacrificed after various periods of tumor growth. The tumors were

removed and weighed, and the number of cells calculated. Cells enriched with macrophages were produced by incubating cells from the peritoneal exudate in Petri dishes, and the cells that adhered were collected and used in experiments. The anti-tumor activity of macrophages was studied in vivo and in vitro using varying doses of transplanted melanoma B16 cells. Upon comparison of the dynamics of tumor growth with the dynamics of anti-tumor macrophage activity, it is seen that cyclicity of changes occurs. Administration of myelopid increases macrophage activity and increases the percentage of tumor development during the early stages of tumor growth. During later stages, myelopid retains its macrophage activity and increases the survival period of the animals. Figures 3, references 9: 5 Russian, 4 Western.

UDC 616-07

### Changes in Intracellular cAMP of Lymphocytes in Peripheral Blood in Acute Viral Hepatitis B Treated With Plaferon

907C0528B Tbilisi SOOBSHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 136 No 1, Oct 89 (manuscript received 22 Jun 89) pp 173-176

[Article by V. I. Bakhutashvili, G. I. Kvitaishvili, and A. V. Bakhutashvili, Experimental Morphology Institute imeni A. N. Natishvili, GSSR Academy of Sciences]

[Abstract] Plaferon, which has antiviral, immunomodulating, and detoxifying properties, was used to treat viral hepatitis B. Fifty-four patients with acute viral hepatitis B and 19 healthy donors were examined. The experimental group received one dose of plaferon per day for 3-7 days. The average cAMP level in the lymphocytes in the peripheral blood of viral hepatitis B patients was normal. Theophylline, a phosphodiesterase inhibitor, increases the level of intracellular cAMP and may serve as an index of the activity of adenylate cyclase, which is one of the intracellular cAMP synthesizers. After incubating mononucleate cells with theophylline, the researchers found the same increase of intracellular cAMP that occurs in healthy donors in the viral hepatitis B patients at the height of the disease. The addition of theophylline increased intracellular cAMP only in the lymphocytes of those who received plaferon. Plaferon modulates cAMP intracellular metabolism, improving the functional activity of mononucleate cells in the peripheral blood. Figures 2, references 3: 2 Russian, 1 Western

UDC 615.339:578.245].015.46.07

**Study of Immunoregulating Properties of Reaferon**

907C0574C Moscow *ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII* in Russian No 12, Dec 89 (manuscript received 2 Jul 88) pp 54-57

[Article by R. N. Vasilenko, K. E. Kondakov, L. N. Semenkova, L. A. Denisov, and V. G. Galaktionov, Institute of Immunology of the USSR Ministry of the Medical and Biological Industry]

[Abstract] Experimental data that were obtained by blast transformation of lymphocytes and by assessing the humoral immune response and results of the delayed-type hypersensitivity reactions are presented. Reaferon (recombinant  $\alpha_2$ -interferon) obtained by genetic engineering was used for clinical tests on a number of viral infections in first-generation hybrid (CBAxC57BL/6) mice. The effect of reaferon on the dynamics of antibody-forming cells was assessed in a local hemolysis reaction in agarose gel. The effect of reaferon varies depending on the time of its administration to the cell culture and on the dose of the preparation. Low doses of reaferon stimulate blastogenesis, while high doses suppress it. The effect of reaferon on the humoral immune response depends on the dose and periods of administration of the preparation to the animals. Incubation of murine lymphocytes immunized with ram erythrocytes with interferon led to a substantial decrease in antibody-producing cells. The effect of reaferon on delayed-type hypersensitivity also depends on the dose and periods of its use. The decrease in the delayed-type hypersensitivity reactions in the resolution phase may be associated with interferon's ability to act directly on the delayed-type hypersensitivity effector cells, suppressing the production of the factor that inhibits macrophage migration.

Genetically engineered reaferon has the immunoregulating properties typical of human leukocytic  $\alpha$ -interferon. Figures 3, references 14: 4 Russian, 10 Western.

UDC 612.017.1:615.575:[616.98:579/841.93]

**Induction of Endogenous Interferon by Therapeutic Brucellosis Vaccine and Its Effect on the Body's Resistance to Viral Infections and Malignant Tumors**

907C0409B Alma-Ata *ZDRAVOKHRANENIYE KAZAKHSTANA* in Russian No 9, Sep 89 pp 32-33

[Article by N. V. Pak, K. S. Doskhozhayev and R. D. Aspetov, Scientific Research Institute of Epidemiology, Microbiology and Infectious Diseases, Alma-Ata]

[Abstract] Brucellae induce production of interferon. Commercial production of therapeutic brucellosis vaccine (TBV) consisting of inactivated *Br. melitensis* has been introduced in the USSR. Some experimental results on the antiviral and antitumor effects of TBV were reported. TBV was shown to produce  $\alpha$ -interferon in mice 5-6 hrs after IP or IV injection; the circulating levels were considerably higher than the organ levels (spleen, lungs, heart, brain). Simultaneous immunization with TBV and infection with influenza virus delayed the death of the experimental animals 2-3 days (control animals died after 4-5 days, experimental animals, after 6-8 days); in addition, only 50 percent of those infected in the experimental group died. A similar delaying effect was observed with implanted Ehrlich carcinoma, with the latent period by about three days. A synergistic effect was seen in therapy combined with radiation or chemotherapy. A review of 2,000 clinical charts of patients with chronic or acute brucellosis treated during the past 11 years showed that none of them has any herpes diseases and only one had a malignant tumor. It was concluded that this could be related to the periodic treatment of such patients with inactivated brucellosis vaccine.

UDC 616-002.3-092.9-02:615.849.19]-07

**Transformation of Liquid-Crystal Complexes in Biological Body Fluids After Local Laser Stimulation of Healing of Purulent Wound in Experiment**

907C05394 Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTALNAYA TERAPIYA in Russian No 6, Nov-Dec 89 (manuscript received 30 Mar 88) pp 35-37

[Article by R. I. Mints, S. A. Skopinov, S. V. Yakovleva, V. M. Lisiyenko, and O. V. Drobina, Department of Applied Biophysics, Physico-Technical Faculty, Ural Polytechnical Institute, Sverdlovsk; Department of Surgical Diseases, Stomatological Faculty, Sverdlovsk Medical Institute]

[Abstract] The liquid-crystal complexes of various systems of the body (tissue fluid of the wound, blood serum, bile, and gastric and intestinal mucus) were studied after local laser therapy used to accelerate processes that occur during the healing of a wound with a purulent inflammation. Eighteen large albino male rabbits were injected with staphylococcus to induce formation of a purulent abscess. Fifteen laser therapy treatments were performed on the wounds. Samples of various body fluids were

extracted and tested. Drops of the fluids were placed between slides and cover slips and kept in the dark for 24 hours. Concentration changes in the biological fluids caused by evaporation of the water induced the formation of liquid-crystal structures. Transformation of the liquid-crystal structures of biological fluids after laser treatment of a wound manifests itself in the rearrangement of the isotropic and anisotropic structures observed in the various models. The area covered by anisotropic structures in the samples in the experimental group increased five- to sixfold, and the dimensions of individual dendritic crystals increased three- to fourfold. By comparison, in the control group the area of the anisotropic structures doubled, and the dendritic crystals increased in size by a factor of 1.5. The most substantial changes were observed in the sera and cytoplasm. Laser therapy, while accelerating the healing of a purulent wound, simultaneously induces the formation and rearrangement of the liquid-crystal structure of biological fluids. Localized treatment of the wound photophysically transforms the liquid-crystal structure not only in the cytoplasm of the wound, but also in the biological fluids such as the bile and intestinal and gastric mucus, which are far from the wound. That can be used for practical purposes of developing diagnostics and corrective techniques using laser therapy. References 6 (Russian).

UDC 617-001.17-092.9-085.31:577.112.853

**Accelerating the Healing of Burns in Rats With  $\alpha_1$ -Acid Glycoprotein**

907C0539B Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTALNAYA TERAPIYA in Russian No 6, Nov-Dec 89 (manuscript received 5 Mar 88) pp 37-40

[Article by V. V. Salomatin, T. M. Sobolevskaya, T. V. Kurilova, and R. I. Lifshits, Department of Biochemistry, Chelyabinsk Medical Institute]

[Abstract]  $\alpha_1$ -Acid glycoprotein is an acute-phase plasma protein whose synthesis in the liver is increased during acute inflammation. The therapeutic effect of that protein during its early use in acute inflammation, especially that caused by burns, was studied in experiments performed on 69 white, outbred female rats, on whose backs burns were produced with infrared irradiation. The preparations being researched—normal saline, albumin, and  $\alpha_1$ -acid glycoprotein—were administered intraperitoneally 3, 24, and 48 hours after the burn in 1 ml of normal saline. On the fourth and fifth days, all the animals were infected with a staphylococcus culture to assess the degree of immunodepression on the basis of signs of infection development. Rectal temperature, body weight, and complications were monitored throughout the experiment. After the burn began to be covered with epithelium, the animals were sacrificed and the internal organs were examined. The administration of the preparations was found to have resulted in a steady decrease in the number of fatalities from shock via replenishment of the fluid in the circulatory channel. There were substantial differences among the groups of animals. In the animals that received  $\alpha_1$ -acid glycoprotein, the burn scabs detached and a bright red granulated surface was revealed. The rats that were administered albumin or normal saline had only a slight reduction in the area of the burn and significant thickening of the scabs. Ulcers or inflammatory lesions developed in the large intestine. Early administration of  $\alpha_1$ -acid glycoprotein to animals with thermal burns was found to have a therapeutic effect. References 15: 3 Russian, 12 Western.

UDC 616.126.42-089.843-092.9

**Xenotransplantation of Tissues Into Vascular Channel**

907C0498C Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 11, Nov 89 (manuscript received 17 Feb 89) pp 28-32

[A. V. Shott, A. S. Leontyuk, A. A. Abukhovskiy, and S. I. Tretyak, First Department of Surgical Diseases, Department of Histology and Embryology, Minsk Medical Institute]

[Abstract] The behavior of xenogenic tissues in the vascular channel was studied. Eighteen chronic experiments were performed on male and female dogs. A rib fragment containing compact bone and hyaline cartilage from a donor rabbit was implanted into the abdominal aorta and posterior vena cava of the recipient dog. Bone xenotransplants were also implanted into the subcutaneous fatty tissue, muscle, peritoneum, and greater omentum. Non-sterilized "fresh" viable tissues were transplanted. Transplantation of a bone into the opening of vessels was selected as an experimental model for studying the reaction of the vascular channel of the recipient to viable tissue that receives its nutrition by diffusion. The loss of cellular elements by the bone xenotransplants reflects processes of primary trophic dysadaptation of the transplants in the vascular channel. Maintenance of bone tissue with a large number of osteocytes in blood for 9-12 months and the death of tissue in other transplant areas point to the feasibility of tissue trophics with nutrition by diffusion and to features of the rejection reaction. The cellular elements are better preserved in arterial than in venous blood. The fresh bone xenotransplants break down and are replaced with connective tissue more quickly than allogenic tissue in the subcutaneous fatty tissue, muscle, and peritoneum, and greater omentum. The times of appearance, degree of expression, spread of cellular infiltration, and type of infiltrates varied in the vascular channel and other anatomic areas. The cellular infiltrates in the blood were more moderately expressed at 2-4 weeks, and neutrophil leukocytes dominated in them. Infiltration then subsided and separate groups of lymphocytes appeared, primarily in areas of bone resorption. Long-term retention of a large number of osteocytes, less expressed resorption of the bone xenotransplant and cellular infiltration of the bed in the vascular channel showed that cellular rejection is only slightly expressed or is absent in the blood environment, except for the resorption zone. Dystrophic changes in the cartilaginous xenotransplants can be explained by inadequacy of the culture and possibly excess nutrition in the blood channel. Figures 4, references 12 (Russian).

UDC 616.83-001-02:547.581.1-07

**Effect of p-Aminomethylbenzoic Acid (Amben) on Regeneration of Peripheral Nerve Tissue**

907C0389B Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTALNAYA TERAPIYA in Russian No 5, Sep-Oct 89 (manuscript received 21 Mar 88) pp 60-62

[Article by Yu. B. Chaykovskiy, G. N. Voytenko, Yu. N. Dobrovolskiy and V. V. Diordiychuk, Institute of Post-graduate Medicine, Kiev]

[Abstract] The effect of p-aminomethylbenzoic acid (Amben) on regeneration of sciatic nerve was evaluated against the effects of other drugs widely used for treatment of nerve injury. Experiments performed on rats

showed the Amben to produce conditions favorable to young axons in the neuromas. Dog experiments indicated that Amben acted on the connective tissues of the neural scar, promoting the growth of axons from the central to peripheral stump and accelerating their maturation. On the basis of those results, Amben was recommended for treatment of peripheral nerve injuries. References 7: 5 Russian, 2 Western.

UDC 615.38.015.2:615.246.2].03.07

#### Use of Silicon Immunosorbents in Hemosorption

907C0389C Moscow PATOLOGICHESKAYA  
FIZIOLOGIYA I EKSPERIMENTALNAYA  
TERAPIYA in Russian No 5, Sep-Oct 89 (manuscript  
received 10 Sep 87) pp 62-65

[Article by D. V. Kulayev, I. P. Andrianova, V. V. Zuyevskiy, T. K. Lyukova, O. V. Silantyeva and Ye. S. Nalivayko, Laboratory of Affinity Sorption, Scientific Research Institute of Physical-Chemical Medicine, RSFSR Ministry of Health, Moscow]

[Abstract] Experimental testing of immunosorbents suitable for perfusion of whole blood was carried out. Immunosorbents were prepared by covalent immobilization of human serum albumin or polyclonal monospecific rabbit antibodies to Human B apoprotein on chemically modified macroporous silochrome. Experiments on rabbits showed that sorbent perfusion was carried out without any problems; it was uniform, with no change in column resistance. Thrombocyte levels dropped in peripheral blood down to 50-70 percent, however, that was corrected by pre-treating immunosorbents with intact rabbit serum. A study of immunosorbents on

monkeys showed the sorbents to be satisfactorily compatible with blood and capable of regenerating, which means they can be used more than once. The most useful application of this technique is in emergency detoxification of the blood. Figures 1; references 7: 3 Russian, 4 Western.

#### Early Screening Test for Cancer

907C0525A Moscow IZOBRETATEL I  
RATSIONALIZATOR in Russian No 1, Jan 90  
pp 20-21

[Article by Yu. Karapetyan, under the rubric "Ideas and Solutions": "Index of Predisposition"]

[Abstract] Onik and Anait Karapetyan, a Yerevan father-and-daughter cancer-research team, have discovered anti-cancer properties in *Escherichia coli* and enterococcus bacteria. They have isolated four strains of the bacteria and have cultured them. The Karapetyans assert that, *in vitro*, the bacteria are aggressive toward malignant tumors and can destroy them. Further study and explanation are needed before it can be concluded whether the strains can cure people with cancer. Because the activity coefficient of the bacteria has been found to be much lower in people with cancer than in healthy people, the researchers conclude that cancer begins developing in the body when those bacteria lose their protective function. The Karapetyans have developed a test that determines the activity level of the bacteria. A low level, they say, means that there is a tumor in the body. They also assert that the activity level of the anti-cancer bacteria immediately rises when the bacteria are ingested. In a blind study, the Karapetyans are said to have correctly diagnosed cancer in a number of patients.

UDC 576.8.093.1

**Reduction of Some Variable-Valence Elements by Heterotrophic Microorganisms**

907C0526 Alma-Ata VESTNIK AKADEMII NAUK KAZAKHSKOY SSR in Russian No 2, Feb 90 pp 60-63

[Article by S. A. Abdrashitova, A. N. Ilyasletdinov, A. K. Ubaydulayeva, and S. A. Aytakeldiyeva]

[Abstract] Polyreductant microorganisms from various systematic groups were isolated, and the number of inorganic variable-valence elements that are reduced by those microorganisms was expanded. The ability of the microorganisms to reduce nitrates, sulfates, Fe(III), arsenate, chrome (VI), and manganese was verified. The microorganisms were cultured in aerobic and anaerobic conditions, and 10 strains of microorganisms that have polyreductant properties were isolated. Heterotrophs capable of reducing a large number of variable-valence elements are widespread in nature and are represented by various groups. Asporophytic bacilliform microorganisms most actively reduce the variable-valence elements, which suggests that global geochemical conversions of variable-valence elements are accomplished on a large scale by common chemoorganotrophic microorganisms as well as by autotrophs. References 17: 11 Russian, 6 Western.

UDC 616.935-092.9-092:612.017.1]-07

**Detection of Specific Antigens in Experimental Anthrax**

907C0574D Moscow ZHURNAL MIKROBIOLOGII, EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 12, Dec 89 (manuscript received 12 Oct 88) pp 63-68

[Article by V. A. Abalakin, L. V. Sergeyeva, and B. L. Cherkasskiy, Central Scientific Research Institute of Epidemiology of the USSR Ministry of Health]

[Abstract] The *Bacillus anthracis* antigens in the blood sera and pathological material from diseased animals that are significant to the intravital diagnosis of anthrax

were determined using passive hemagglutination test and heterogenic enzyme immunoassay to study the content of the lethal toxin factor of somatic antigens and nonprotective protein. *B. anthracis* vaccine strains STI-1, 34F<sub>2</sub>, Tsenkovskiy's second vaccine, and *B. cereus* strain 104 were administered to guinea pigs. The protective antigen, lethal toxin factor, and nonprotective protein differ in their biochemical, antigenic, and biological properties. Nonprotective protein is a soluble somatic protein. Guinea pigs infected with Tsenkovskiy's second strain died soon after they developed hypothermia, hypodynamia, and edema of the subcutaneous tissue at the injection site. In the acute period of the disease, antigens to the toxin rather than the somatic antigens of *B. anthracis* dominate in the blood. By using EIA for the lethal toxin factor, the antigen was recorded in the blood sera in 100 percent of the guinea pigs 24 hours after infection, when clinical signs of the disease were absent. Figures 2, references 9: 7 Russian, 2 Western.

**Effect of Climatic Factors on Brucellosis Pathogen in Karakum**

907C0593 Ashkhabad IZVESTIYA AKADEMII NAUK TURKMENSKOY SSR: SERIYA BIOLOGICHESKIH NAUK in Russian No 1, Jan-Feb 90 (manuscript received 26 Feb 88) pp 67-69

[Article by Ch. Kerimov]

[Abstract] Infectious diseases whose pathogens contaminate pasture lands and serve as a source for spreading infection, keep farm animal herd counts down, as well as the productivity of the farm animals. The pathogen of brucellosis, a particularly dangerous disease to man and animal, retains its viability for a long time and can be a source of infection in animals. In the leached chernozem and clayey soil of the Moscow Oblast, the survivability of brucella ranges from 12 to 75 days in the fall, 100 to 115 days in the winter, and 4 to 15 days in the summer. The survivability of brucella and bacteria of groups of *E. coli* in test objects (brick, wood, concrete, etc.) was conducted indoors and outdoors in all seasons. High temperatures (42-45°C) and low relative humidity (5-38 percent) helped quickly eliminate the brucellosis pathogen agent without the use of disinfectants.

UDC 615.31:547.95:547.943.017:615.22.076.9

**Antiarrhythmic Effect of Stress-Limiting Factors of Dalargin and Phenazepam**

907C0418A Moscow

*KHIMIKO-FARMATSEVTICHESKIY ZHURNAL*  
in Russian Vol 23 No 9, Sep 89 pp 1034-1038

[Article by F. Z. Meerson, M. G. Pshennikova, L. M. Belkina, N. A. Abdikaliyev, V. A. Saltykova, and E. Kh. Orlova, Scientific Research Institute of Pathology and Pathological Physiology, USSR Academy of Sciences, Moscow]

[Abstract] Assessment of the effect of dalargin, a Leu-enkephalin analog, and phenazepam, an agonist of benzodiazepine receptors, on ischemic and reperfusion cardiac arrhythmias after occlusion of the coronary artery in intact rats and isolated hearts involved the use of dalargin and phenazepam in male Wistar rats (300-400 g and 200-250 g, respectively). Dalargin was injected intraperitoneally in a dose of 100 µg/kg two days before the experiment and two hours before cardiac ischemia on the day of the experiment. Phenazepam was injected once (1 mg/kg dose) intraperitoneally one hour before ischemia. All forms of arrhythmias during ischemia and reperfusion were shorter in the animals receiving dalargin than in control by a factor of 2-3, and the number of cases of severe arrhythmias was much lower than in control animals. Dalargin did not produce an antiarrhythmic effect in experiments on isolated hearts. Phenazepam resulted in fewer cases of ventricular fibrillation during reperfusions than in controls by a factor of 3.5 and a shorter overall duration of arrhythmias by a factor of almost 5. It provided no protection in isolated heart. Dalargin produced its antiarrhythmic effect during acute ischemia by activating opiate receptors in brain structures and limiting excitation of adrenergic and cholinergic sections of regulation of the heart. Benzodiazepams, including phenazepam, amplify the tonic inhibition of neurons realized by GABA-ergic neurons and exert an adrenergic and cholinergic effect on the heart. The findings emphasize the positive value of the idea of a neurogenic mechanism in cardiac arrhythmias, as well as the good prospects for cardiological clinical practice of the search for new antiarrhythmic drugs among metabolites of central stress-limiting systems and their analogs. References 26: 7 Russian; 19 Western.

UDC 615.277.4:665.44].015.46.07

**Induction of Immune Response to Benzo[a]pyrine by Benzo[a]pyrene-Protein Conjugate Synthesized in Cytochrome P-450 System**

907C0418B Moscow

*KHIMIKO-FARMATSEVTICHESKIY ZHURNAL*  
in Russian Vol 23 No 9, Sep 89 pp 1038-1041

[Article by N. V. Shipulina, N. Yu. Tomilina, I. Ye. Kovalev and V. A. Tomilin, Scientific Research Institute of Drug Technology and Safety, Moscow Oblast]

[Abstract] A study of the conditions of covalent binding of the carcinogen benzo[a]pyrene [I] with proteins in the hepatic system of cytochrome P-450 and the possibility of developing a specific immune response to an injection, into an animal, of the conjugated antigen that is produced involved experiments on male rabbits (1.5-2 kg). Intraperitoneal injections, for 3 days, of 60 mg/kg doses of phenobarbital or 25 mg/kg doses of 3-methyl-cholanthrene were used for induction of the hepatic system of cytochrome P-450. Use of a radioisotope method revealed effectiveness of covalent binding of <sup>14</sup>C-I with rabbit serum albumin (RSA). Considerably greater binding of <sup>14</sup>C-I by lymphocytes occurred in three of four animals immunized by conjugate I-RSA than in control animals. Immunization by the synthesized conjugated antigen produced lymphocytes which bind I in the animals. The experimental conditions which model processes of microsomal oxidation of I in the body produced covalent binding of products of this xenobiotic with both blood serum albumin and with microsomal membranes. The conjugate of I-RSA forming during this is an immunogen capable of inducing development of a specific immune response to the initial carcinogen in the body. Both peripheral blood lymphocytes and serum antibodies participated in formation of the immunological reaction of the conjugated I-protein antigen. The study justified the assumption that I, entering the body, metabolizes hepatic microsomal monooxygenases with formation of highly reactive intermediate products which damage macromolecules (DNA, proteins), leading to carcinogenic effects, but, at the same time, form conjugated antibodies capable of inducing an immune response to I. References 17: 9 Russian; 8 Western.

UDC 615.281.8:547.495.2].07

**Adamantyl-containing Ureas and Link Between Structure and Virus-inhibiting Activity**

907C0418C Moscow

*KHIMIKO-FARMATSEVTICHESKIY ZHURNAL*  
in Russian Vol 23 No 9, Sep 89 pp 1091-1094

[Article by S. D. Isayev, M. I. Novikova, I. G. Semenova, Z. N. Murzinova, N. A. Leontyeva, V. L. Andronova, Ye. V. Demikhovskaya, Ye. I. Boreko, G. V. Vladko, L. V. Korobchenko, and A. G. Yurchenko, Kiev Polytechnical Institute; Institute of Virology, USSR Academy of Medical Sciences imeni D. I. Ivanov, Moscow; Belorussian Scientific Research Institute of Epidemiology and Microbiology, Minsk]

[Abstract] A study of antiviral activity of previously described and newly synthesized derivatives of urea containing the adamantyl radical in relation to certain pathogens of viral infections in man and animals attempted to reveal correlation dependences between the pathogen structure and virus-inhibiting activity. Starting substances for producing such compounds included

(adamantyl-1) isocyanate, (3-methyladamantyl-1)isocyanate and (adamantyl-1)methylisocyanate. Introduction of the methyl group into the adamantane nucleus proved to be quite important in increasing the antiviral activity of the adamantyl ureas in relation to vaccinia virus. The interconnection of activity with the presence of the methyl group in the adamantane radical was not as clear-cut for orthomyxoviruses. There were no taxonomic groups of correlation dependences between the structure and antiviral properties of the compounds. Observation of substances active in relation to DNA-containing and RNA-containing viruses among the adamantyl ureas was high. References 8: 7 Russian; 1 Western.

UDC 615.281:546.54/.56].012.1.07

### Synthesis and Antimicrobial Activity of Coordination Compounds of Certain 3D-Elements With Schiff Bases

907C0418D Moscow  
KHIMIKO-FARMATSEVTICHESKIY ZHURNAL  
in Russian Vol 23 No 9, Sep 89 pp 1098-1101

[Article by N. M. Samus, E. N. Shlyakhov, N. G. Velishko, T. A. Burdenko, T. S. Chayka, V. I. Tsapkov, V. G. Bodyu, and S. P. Borozenets, Kishinev University imeni V. I. Lenin; Kishinev Medical Institute]

[Abstract] Experimental data were presented concerning the synthesis of coordination compounds of copper (2+), nickel (2+), cobalt (2+) and zinc with Schiff bases obtained from 2-aminophenol or 4-amino-1,2,4-triazole and 2-hydroxybenzaldehyde, 2-hydroxy-1-naphthaldehyde, furfural and 5-nitrofuran, as well as a determination of the composition and structure of the compounds and their antimicrobial activity. Test microbes used in experiment in vitro included gram-negative and gram-positive microorganisms. Gram-positive microbes included *Staph. aureus* strains (Wood 46, Smith, Cowan 1, 20); *Staph. epidermidis* strain 42-a; *B. anthracis* strains STI and 71/12, and *B. cereus* strain 8035. Gram-negative microorganisms included *Proteus vulgaris*, *E. coli* strain M-17, *S. typhimurium*, and *Sh. sonnei* (S-form). Elemental analysis, magnetochemical, spectral and thermogravimetric studies revealed the composition of compounds obtained and aspects of their structure. The compounds obtained were tested for antimicrobial activity against strains of *Staphylococcus*, *Proteus*, *Salmonella*, *Shigella* and *Bacillus anthracis*. *Staph. aureus* and *B. anthracis* appeared to be most sensitive to the compounds studied. Data obtained showed the promise of finding new highly active antimicrobial compounds among coordination compounds of 3d-elements with Schiff bases produced from 5-nitrofuran. References 7: 6 Russian; 1 Western.

UDC 615.46:678.664].011.3/.5

### Biocompatibility of Polymer Materials

907C0418E Moscow  
KHIMIKO-FARMATSEVTICHESKIY ZHURNAL  
in Russian Vol 23 No 9, Sep 89 pp 1102-1105

[Article by L. T. Moskvitina, L. A. Mansurova, T. V. Nefedova, T. P. Torschina, V. B. Kazimirovskaya, N. A. Sevastyanova, V. G. Romanovskaya, and Ye. V. Dmitriev, Irkutsk Institute of Organic Chemistry, USSR Academy of Sciences, Siberian Department]

[Abstract] A study of the effect of polycarbonate Diflon, polybutylene terephthalate, poly-4-methylpentene, fluoroplast, polyurethane TPU-3BT and polyethylene on blood coagulation, electrophoretic mobility of erythrocytes and thrombocytes, and resistance of erythrocytes to hydrochloric acid involved biochemical studies of connective-tissue capsules developing around polymer materials of polyurethane PPE-201 and polyethylene in order to determine the biocompatibility of tissues and blood of animals implanted with these polymers. The polymer materials did not display thrombogenic activity and may be used in medical practice. They may be used as a base for different modifications of chemical compounds in order to produce optimal biocompatible surfaces. References 9: 7 Russian; 2 Western.

UDC 615.214.31:547.745.012.1

### Synthesis and Pharmacological Activity of 1-thiocarbamoylmethylpyrrolidine-2-thione

907C0426A Moscow  
KHIMIKO-FARMATSEVTICHESKIY ZHURNAL  
in Russian Vol 23 No 10, Oct 89 pp 1186-1193

[Article by V. G. Granik, T. V. Golovko, R. G. Glushkov, M. D. Mashkovskiy, L. F. Roshchina, A. I. Polezhayeva, R. B. Parimbetova, Yu. G. Bobkov, A. S. Losev, and I. A. Ivanova, All-Union Scientific Research Chemical and Pharmacological Institute imeni S. Ordzhonikidze; Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow]

[Abstract] Synthesis of the dithioanalog of piracetam, 1-thiocarbamoylmethylpyrrolidine [IV], from 1-carbamoylmethylpyrrolidone-2 (piracetam) and from 1-cyanomethylpyrrolidone-2 by using phosphorus pentasulfide was described and discussed, as was its pharmacological activity. Compound IV was more toxic than piracetam after intraperitoneal injection into mice. It was much more active in facilitating the training process in rats and in improving performance of the conditioned reflex reaction of avoidance in comparison with the effect of piracetam. IV had a good effect on rate of training, performance of an elaborated conditioned reflex and consolidation of memory in doses 4-5 times lower than those required for piracetam. Intraperitoneal injection of 250 mg/kg and 500 mg/kg of IV extended the latent period of rise of spasms in rats by 25-30 percent

and increased the period until death by 45-50 percent in comparison with the control. IV proved to be more effective than piracetam in treatment of hypoxias. Complete thio modification (substituting oxygen with sulfur) of piracetam did not change the spectrum of its pharmacological action, but greatly intensified the degree of its nootropic and antihypoxic effects. IV was more effective in smaller doses and produced a pronounced systemic antihypoxic effect. This justified consideration of it as a potential nootropic agent with a high degree of antihypoxic activity. References 13: 10 Russian; 3 Western.

UDC 615.214.012.038

### Synthesis and Pharmacological Study of New Derivatives of Piracetam and Their Thioanalogs

907C0426B Moscow

*KHIMIKO-FARMATSEVTICHESKIY ZHURNAL*  
in Russian Vol 23 No 10, Oct 89 pp 1193-1196

[Article by A. V. Kadushkin, T. V. Golovko, V. G. Granik, R. G. Glushkov, R. B. Parimbetova, V. A. Parshin, and M. D. Mashkovskiy. All-Union Scientific Research Chemical and Pharmacological Institute imeni S. Ordzhonikidze, Moscow]

[Abstract] Synthesis and pharmacological study of derivatives of piracetam substituted by NH<sub>2</sub> of the carbamide group and their thioanalogs were described and discussed. Some of the compounds displayed antihypoxic action and lengthened the life of mice in an airtight chamber. The most effective was N-(β-phenylethyl)amide of 1-carboxymethylpyrrolidone-2, which, in doses of 250 mg/kg and 500 mg/kg, increased survival up to 44.2 minutes and 66.8 minutes, respectively, as compared to 29.8 minutes for control animals. Some of the compounds displayed anti-seizure activity. Some improved the training process and consolidation of the memory trace. The most effective was N-(β-phenylethyl)amide of 1-thiocarboxymethylpyrrolidine-2-thione. LD<sub>50</sub> for mice after intraperitoneal injection of various doses was given. 1-thiocarbamoylmethylpyrrolidone-2, N-(4-methylpiperazide of 1-carboxymethylpyrrolidone-2 and N-benzylamide of 1-thiocarboxymethylpyrrolidine-2-thione displayed antihypoxic effect and antagonism to the convulsive effect of thiosemicarbazide. Compound VIIIb facilitated learning. References 14: 10 Russian; 4 Western.

UDC 615.784:615.785.4

### Cholinolytic Activity of Piperidinobutinic Esters of Some Carboxylic Acids

907C0426C Moscow

*KHIMIKO-FARMATSEVTICHESKIY ZHURNAL*  
in Russian Vol 23 No 10, Oct 89 pp 1206-1209

[Article by L. A. Starshinova, S. A. Shelkovnikov, L. A. Vikhreva, T. A. Pudova, M. Gulyamov, A. A. Abduvakhobov, and N. N. Godovikov, Institute of Evolutionary

Physiology and Biochemistry, USSR Academy of Sciences, Leningrad; Institute of Hetero-organic Compounds, USSR Academy of Sciences, Moscow]

[Abstract] Synthesis and study of 20 analogs of piperidinobutinic and anabasinebutinic esters of acetic acid, thioacetic acid and thiobenzoic acid confirmed their muscarinolytic activity. The compounds are chemically related to the muscarinic cholinoreceptor agonist IP-59. Determination of the muscarinolytic activity of the compounds was demonstrated by using the longitudinal muscle of guinea pig small intestine. Half of the compounds studied are muscarine antagonists. N-(4-acetooxybut-2-inyl)anabasine and iodomethyl of N-(4-benzoylmercaptopbut-2-inyl)piperidine possessed the highest muscarinolytic activity. Introduction of volumetric hydrophobic radicals into both the acid part and the cationic head of IP-59 revealed two new active muscarine antagonists, N-(4-acetylmercaptopbut-2-inyl)anabasine and N-(4-benzoylmercaptopbut-2-inyl)piperidine iodomethylate. References 3: 1 Russian; 2 Western.

UDC 615.849.015.25:547.466.3].012.1

### Synthesis and Radioprotective Activity of Amides of 3-(2-mercptoethyl)aminopropionic Acid

907C0426D Moscow

*KHIMIKO-FARMATSEVTICHESKIY ZHURNAL*  
in Russian Vol 23 No 10, Oct 89 pp 1241-1244

[Article by G. A. Chernov, N. I. Lisina, N. M. Karimova, V. M. Bystrova, and O. V. Kildisheva, Institute of Biophysics, USSR Ministry of Health]

[Abstract] Synthesis of 3-(2-mercptoethyl)aminopropionic acid amide tosylate and some of its derivatives and study of their radioprotective effect involved determination of the acute toxicity after intraperitoneal and oral administration of aqueous solutions of the substances prepared ex tempore in doses on a logarithmic scale to outbred male white mice (20-24 g). The radio-protector efficiency of the compound was determined in F(CBAXC<sub>57</sub>Bl) male mice (20-23 g), who underwent intraperitoneal injection of the compound before <sup>137</sup>Cs gamma-irradiation in a dose of 900 R at a dose rate of 213 R/min. The compounds were found to be slightly toxic with LD<sub>50</sub> for them after both methods of administration at more than 2000 mg/kg, except for 3-(2-propylthiazolidine)propionic acid amide, whose LD<sub>50</sub> is threefold higher, at 630 mg/kg. 2[2-mercptoethyl]aminopropionic bromide and amide tosylate displayed high activity regardless of the salt form. A feature of the antiradiation effect of agents in this series was the duration of radioresistance of the experimental animals (up to 1.5 hours), but this effect was achieved at higher doses of the compounds. References 8: 4 Russian; 4 Western.

UDC 615.849.1.015.25.014.44.076.9

**Effectiveness of Liposomal Form of Pentacin in Eliminating Cadmium in Intoxicated Rats**

907C0426E Moscow

KHIMIKO-FARMATSEVTICHESKIY ZHURNAL  
in Russian Vol 23 No 10, Oct 89 pp 1244-1246

[Article by G. I. Muzya, N. D. Dogadkina, Ye. A. Osipova, Ye. V. Grigoryeva, G. V. Prokhorova, and V. I. Kulikov, Scientific Research Institute of Biomedical Technology, USSR Ministry of Health, Moscow; Moscow State University imeni M. V. Lomonosov]

[Abstract] A study of the effectiveness of the liposomal form of pentacin on models of cadmium intoxication in animals in the late periods after drug administration used a 5-percent solution of pentacin in experiments on male, outbred white rats (220-240 g). Subcutaneous injections (4) of cadmium chloride produced cadmium accumulation mainly in the rat liver and kidneys, but also in the spleen, lungs and heart. A single intraperitoneal injection of pentacin in solution within 48 hours after cadmium chloride injection did not affect cadmium concentration in the liver of intoxicated rats, but pentacin in liposomal form produced a twofold reduction of cadmium concentration in rat liver. Pentacin in aqueous form had practically no effect on the cadmium level in the liver, kidney, spleen, heart or lungs, but pentacin in liposomal form greatly reduced the cadmium content in the liver. The chelating effect of pentacin in liposomal form in relation to cadmium in the liver after late periods of injection confirms the assumption that the liposomal form of pentacin may be useful during treatment of chronic cadmium intoxication. References 7: 2 Russian: 5 Western.

UDC 616.63-541.135:612.014.46

**Renotrophic Effect in Response to Small Doses of Central Asiatic Cobra Venom**907C0497B Ashkhabad ZDRAVOOKHRANENIYE  
TURKMENISTANA in Russian No 10, Oct 89 pp 19-22

[Article by A. T. Berdyyeva, B. B. Batyrov, B. B. Babayev, L. A. Molotova, Department of Biology of Turkmen Order of Friendship of Peoples State Medical Institute; Scientific Research Institute for Protection of Maternal and Pediatric Health]

[Abstract] Information is presented concerning the dynamics of some indices of the functional condition of the kidneys after the administration of only slightly toxic doses of Central Asiatic cobra venom that do not produce any noticeable clinical signs of poisoning. The venom was diluted with normal salines and administered intramuscularly. The animals that received the cobra venom excreted slightly more water than the control animals. The nature of renal response to only slightly toxic doses of Central Asiatic cobra venom depends mainly on the condition of glomerular filtration. The kidneys' ability to stabilize the volume of circulating plasma and blood seems to be stressed somewhat, as indicated by preventive decompensation. Such factors require strict control of the functional condition of the kidneys when using only slightly toxic doses of cobra venom for therapeutic purposes. Figures 3, references 5 (Russian).

UDC 613.26-633.11].099

**Study of Contamination of Wheat From 1986-1988 Harvests With Desoxynivalenol (Vomitoxin)**907C0608 Moscow VOPROSY PITANIYA in Russian  
No 1, Jan-Feb 90 (manuscript received 11 Nov 88)  
pp 68-71

[Article by V. S. Sobolev, K. I. Eller, V. V. Pimenova, L. P. Zakharova, N. I. Muzychko, and V. A. Tutelyan, Nutrition Institute of the USSR Academy of Medical Sciences]

[Abstract] The frequency and level of contamination of wheat from the 1986-1988 Krasnodarskiy Kray harvests were studied, and the data obtained were compared with the degree of fusarial wilt contamination of the grain. A total of 175 samples were taken from elevators, warehouses, etc., from 1986 to 1988 and visually analyzed. In all, 93 samples had signs of fusarial wilt. Thin-layer chromatography was used to screen for desoxynivalenol. Eighty percent of the wheat samples studied were found to have desoxynivalenol, and 55 percent contained the toxin in amounts that exceeded the maximum acceptable limit. A degree of fusarial wilt contamination of 0-0.6 percent may serve as a criterion for identifying batches of grain that contain safe concentrations. One should note the trends toward growth in degree of fusarial wilt in wheat and level of desoxynivalenol contamination. If fusarial wilt is not stopped, a real danger to human and farm animal health may develop. References 10: 5 Russian, 5 Western.

UDC 615.373.017:615.212].076.9

### Long-Term Analgesic Effect of Antiserum to $\beta$ -Endorphin in Rats

907C0389A Moscow PATOLOGICHESKAYA FIZIOLOGIYA I EKSPERIMENTALNAYA TERAPIYA in Russian No 5, Sep-Oct 89 (manuscript received 15 Apr 88) pp 50-52

[Article by S. V. Litvinova, V. V. Aristova, Yu. A. Aristov, V. V. Shulgovskiy and L. V. Kalyuzhnyy, Department of Higher Nervous Activity, Biology Faculty at Moscow State University imeni M. V. Lomonosov, Scientific Research Institute of Normal Physiology imeni P. K. Anokhin, USSR Academy of Medical Sciences, Moscow]

[Abstract] Opioid peptides, particularly  $\beta$ -endorphin, are known to produce a strong analgesic effect, whereas  $\beta$ -endorphin antiserum intensifies pain sensitivity and blocks morphine-produced and acupuncture-produced analgesia in experimental animals. In the present study, the long-term effect of  $\beta$ -endorphin antiserum was investigated. It was shown that the pain sensitivity threshold was lowered immediately after administration of the antiserum; it later began to rise, and, after one week, it exceeded the control values by a factor of 1.5-2. The higher nociceptive reaction lasted 2-3 months after the initial administration of the antiserum. It was concluded that  $\beta$ -endorphin antiserum led to dual response: initially a short-term hypersensitivity to pain because of the blockade of endogenous  $\beta$ -endorphin, followed by a long-term secondary effect of higher pain threshold related to the activation of the endogenous opioid system—a rebound effect to diminished release of  $\beta$ -endorphin in the body. The data may serve as a basis for using the antiserum as a long-lasting analgesic. Figures 1; references 4 (Russian).

UDC 577.17:612.018+591.147+616.45-001

### Effect of Prolactin on Oxidative Enzymatic Activity in Medulla Glandulae Suprarenalis in Mental and Physical Stress and Hypokinesia

907C0497A Ashkhabad ZDRAVOOKHRANENIYE TURKMENISTANA in Russian No 10, Oct 89 pp 13-15

[Article by V. S. Strizhkov, Department of Histology, Cytology, and Embryology, Turkmen Order of Friendship of Peoples State Medical Institute]

[Abstract] The effect of prolactin on the activity of oxidation-reduction metabolic enzymes and an enzyme that inactivates catecholamines in animals subjected to mental and physical stress was studied. Twenty-five white male rats were divided into five groups of five rats each, with one control group and one group subjected to a painful electric current after development of a conditioned avoidance

response and then sacrificed. A third group was administered prolactin 1 hour before painful electric current irritation; a fourth was subjected to hypokinesia for 24 hours and then painful electric current irritation; and a fifth, which was subjected to hypokinesia, was administered prolactin 1 hour before painful electric current irritation. After the experiment, all the remaining animals were sacrificed and their adrenal glands removed. Enzymatic activity was assessed—succinate dehydrogenase (SDH), lactate dehydrogenase (LDH), glucos-6-phosphate dehydrogenase (G-6-PDH),  $\text{NADH}_2$  and  $\text{NADPH}_2$ -tetrazolium reductase ( $\text{NADH}_2$ -TR and  $\text{NADPH}_2$ -TR), ATPase, and MAO. Prolactin was found to depress the intensity of enzyme systems for aerobic oxidation of carbohydrates in chromaffine cells and to increase inactivation of the catecholamines synthesized by them. When the rats were subjected to hypokinesia and painful electric current irritation, the activity of the enzymes studied was lower than under all other conditions. Administration of prolactin following hypodynamia increased SDH, G-6-PDH,  $\text{NADPH}_2$ -TR, and ATPase activity in response to painful electric current irritation. Suppression of enzymatic activity of energy metabolism may be explained by the immobilization. When there is little reactivity of the medulla, prolactin increases its functional activity in response to mental and physical stress. But in those conditions, prolactin stimulates the pentosephosphate cycle enzymes to a greater degree. References 6: 1 Russian, 5 Western.

UDC 612.822.1+577.15/17

### Effect of Delta-Sleep Peptide on Content of Homocarnosine in Rat Brain During Cold Stress

907C0566 Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 75 No 12, Dec 89 (manuscript received 4 Feb 88) pp 1788-1790

[Article by T. I. Bondarenko, A. A. Krichevskaya, and I. G. Papakina, Department of Biochemistry and Bioengineering of State University]

[Abstract] Study of the biological role of the delta-sleep-inducing peptide showed that it can be regarded as a "programming" factor whose effects become more obvious when the normal functioning of the body is upset. The effect of various doses of systemically administered delta-sleep peptide on the content of homocarnosine in the rat brain during cold stress was studied. Delta-sleep peptide with the structure Trp-Ala-Gly-Asp-Ala-Ser-Gly-Glu was synthesized at the Institute of Bioorganic Chemistry imeni M. M. Shemyakin. White male rats were administered varying doses of delta-sleep inducing peptide and placed in a cold chamber for 3 days, after which the content of homocarnosine in the brain was ascertained. The homocarnosine content decreased by 50 percent more in the experimental rats than in the control group, indicating a disturbance in the inhibitory processes in the brain at low temperatures. The change in the homocarnosine level in the brain is inversely related to the dose of delta-sleep peptide. Preliminary administration of the peptide to animals in cold temperatures normalizes the lipoperoxidation process, stabilizes the lysosome and erythrocyte membranes, and decreases the activity of hydrolytic enzymes. References 13: 12 Russian, 1 Western.

UDC 616-002.5-084 (574.54)61.001.5.004.14

**Experience in Complex Expeditions**907C0409A Alma-Ata ZDRAVOOKHRANENIYE  
KAZAKHSTANA in Russian No 9 Sep 89 pp 21-23

[Article by Z. T. Ryspekov, A. S. Sadvokasov, A. Zh. Mazhitova, V. Ya. Trenogina, T. Zh. Zhaparov and B. Zh. Zhumakhmetov, Kazakh Scientific Research Institute of Tuberculosis, Alma-Ata; Kzyl-Orda Oblast Anti-tuberculosis Screening Center]

[Abstract] The tuberculosis screening expedition into the Aralskiy Rayon, Kzyl-Orda Oblast, was organized in 1988 by the Kazakh Scientific Research Institute of Tuberculosis. The expedition consisted of three teams: the first concentrated on central sovkhoz farms and larger settlements; the second visited workers employed in cattle operations; and the third, concentrating on the pediatric population, worked in hospitals, outpatient clinics, and the larger paramedic-obstetrics stations. All the teams started their work on the periphery of the rayon and finished it in the rayon center. In all, 30,617 individuals were examined. Children 3-6 years of age accounted for 87.7 percent of the negative tuberculin tests. The largest number of questionable test results were found in young children (14.0 percent) and adolescents (19.4 percent). Among those positive for the Mantoux test were primarily poorly delineated reactions 5-11 mm in diameter: 8.6-14.5 percent among adolescents, and 4.6-5.7 percent among younger children. All newly discovered cases were hospitalized. Many of the individuals were asymptomatic. This type of screening will continue and may be extended to other regions. References 2 (Russian).

UDC 616-036.36.86-07(470)

**Disability in RSFSR and Its Dynamics**907C0414A Moscow ZDRAVOOKHRANENIYE  
ROSSIYSKOY FEDERATSII in Russian No 10, Oct 89  
pp 3-6

[Article by N. A. Demidov, Central Scientific Research Institute for Appraisal of Fitness for Work and Organization of Work for the Disabled]

[Abstract] A study of the dynamics of disability in the RSFSR from 1960 to the present showed that environmental protection measures, improvement of the life and work of the people and development of the material base of health care has reduced disability by 61.8 percent. The greatest success was achieved in treatment of tuberculosis, diseases of the circulatory system, digestive system and respiratory system and mental disease. Disability remained at the same level from 1982-1987. Since the rates of reduction of disability from many diseases dropped and the number disabled by some diseases increased, the number of disabled increased from 4.6 million to 5.5 million from 1980-1986. Moscow has one

of the highest levels of disability, with a clear connection between those levels and flaws in medical examination of the people. In 1984, the RSFSR ministries of social insurance and of health issued a joint edict aimed at improving work geared toward preventing disability and assisting the disabled. The correlation between inattention to disability and overall morbidity was discussed. A high level of disability remains not only in separate enterprises, but also in sectors of industry as a whole. The structure of disability in different ministries was examined and discussed. Poor work conditions were found to exist in 46 percent of the disability cases. Problems concerning reduction of the length of disabilities were described and discussed. References 15 (Russian).

UDC 616.98:578.832.1]-036.4-085.261.8-036.8-07

**Socioeconomic Prospects of Early, Free Treatment of Influenza With Remantidine**907C0414B Moscow ZDRAVOOKHRANENIYE  
ROSSIYSKOY FEDERATSII in Russian No 10, Oct 89  
pp 11-14

[Article by O. I. Kubar, Yu. V. Lukyanov, T. G. Ryazantseva, T. A. Novikova, D. M. Zlydinikov, and F. S. Noskov, Scientific Research Institute of Epidemiology and Microbiology imeni Pasteur, Leningrad]

[Abstract] Losses of national income because of influenza and other acute respiratory virus infections are as high as 301.6-365.8 million rubles a year in the Kazakh SSR alone. Such losses are of secondary importance to the social loss. Many years of experience in the use of remantadine in the treatment of influenza have made it possible to assess the economic results of the use of the first specific influenza drug. The evaluation involved calculation of the total economic losses prevented by the use of remantadine administered for free in controlled medical programs and calculation of the possible savings from use of the drug in Leningrad on the basis of morbidity among the adult population and the value of the sale of the drug from 1978 to 1987. Data concerning treatment of 5,517 patients with remantadine in the 1980 influenza B epidemic showed savings of 9102.1 work days and savings of 153,438.7 rubles. That works out to a prevented loss of 27.8 rubles per patient. Treatment of 51,502 influenza patients with free remantadine in supervised observations showed a savings of 218,653.8 man-days, which worked out to a savings, based on the cost of free drug distribution, of 3,840,687.35 rubles, or savings of 39.85 rubles per patient. Such findings showed the possibility of effective, inexpensive medical treatment that means a savings to the State budget on scales achieved in Leningrad in the year of the epidemic of up to 8.1 million rubles, based on the cost of the drug. References 8 (Russian).

UDC 614.2:616-084.3

**Improvement of Forms and Methods of Work of Institutes With Practical Health Care Agencies for Performing Mass Health Screening of the Population**

907C0414C Moscow *ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII* in Russian No 10, Oct 89 pp 22-26

[Article by G. Z. Demchenkova and N. P. Soboleva, All-Union Scientific Research Institute of Social Hygiene, Economics and Administration of Health Care imeni N. A. Semashko, Moscow]

[Abstract] The article defines mass health screening as a single integrated system that provides for comprehensive evaluation of the state of public health, ongoing observation of the health of each individual, and complex implementation of socioeconomic and medical measures for improving working and domestic conditions. The basic forms of joint work performed by higher educational institutions and scientific research institutes, on the one hand, and practical health care agencies, on the other, should include the following: (1) contracts (5-year and annual contracts) for creative collaboration between scientific and practical health-care institutes; (2) development by specialized scientific research institutes and departments of medical schools, in collaboration with health care agencies and institutions, of complex planned programs for screening the population at various levels (shop, district, institution, rayon, city, oblast, republic, region); (3) development by scientific research institutions, postgraduate medicine institutes, and departments of medical schools of specific measures, including the introduction at specific institutions of scientific advances for carrying out universal health screening, the creation and dissemination of procedural manuals for the screening, the assignment of specialists to perform annual check-ups and to evaluate the quality of the screening work being done, and, among other things, regular consultation in city polyclinics and hospitals by visiting staff from research institutes and medical schools; and (4) development, certification, and introduction of new measures for the prevention, early detection, and treatment in connection with mass health screening.

UDC 614.2:681.31

**Introduction of Computers Into Novgorod Oblast Health Care**

907C0499A Moscow *SOVETSKOYE ZDRAVOOKHRANENIYE* No 11, Nov 89 (manuscript received 24 Oct 88) pp 11-13

[V. A. Medik, V. I. Romanishin, and M. L. Ofengym, Novgorod Oblast Health Department of the Council of People's Deputies]

[Abstract] The Novgorod Oblast Health Department executive committee is putting computers into operation in health care agencies and facilities and is creating automated information and management systems. The center for organizing and coordinating the work in that regard is the section for automated management systems of the oblast health department, which is developing and putting into operation various complexes of interconnected tasks for management, diagnostics, statistics, prognostics, and monitoring, which will later be combined into the proper subsystems. The "Statsonar" [Hospital] subsystem is currently servicing a number of hospitals in the Novgorod region in terms of reporting, monitoring, and analysis of facility activity; reporting and analysis of bed availability; and reporting and analysis of the coordination of work done in hospitals and oblast consultation centers. The lower cost of processing information on the computer as compared with traditional manual methods makes it economical. Since 1984, the oblast administration for the obstetrics and gynecology service has been using computers to analyze the pathology of placentas and identify women in need of examination and treatment. The data obtained make it possible to thoroughly study the causes of miscarriage and stillbirth, diagnose intrauterine infections in time, and identify women in risk groups, as well as decrease perinatal and child mortality. A screening program is in operation to detect early signs of disease among infants 1 year old or under. The improvements in terms of availability of information and the promptness and adequacy of measures taken have led to a decline in infant, maternal, and perinatal mortality. Structurally, the oblast automated control system is a complex of functionally interrelated and supporting subsystems. Standardization of the information in the oblast automated control system and the subsystems that function in it remains a large problem.

UDC 614.2:616-08-039.57

**Experience in and Prospects of the Automation of Polyclinic Operation**

907C0499B Moscow *SOVETSKOYE ZDRAVOOKHRANENIYE* No 11, Nov 89 (manuscript received 20 Dec 88) pp 14-17

[G. P. Zubarev, V. G. Kirilyuk, A. Ya. Ladnyy, A. N. Lushchitsov, I. Ya. Rafalyuk, and L. A. Shuster, Executive Committee of the Lvov Oblast Council of People's Deputies]

[Abstract] Improvement of the material base of treatment-and-prevention facilities and the creation of automated control system departments in them has made it possible to handle problems associated with the introduction and use of computers and automated systems in polyclinics in a new way. Before the polyclinics had their own computers, they used the automated control systems of the industrial enterprises that they served, which

employed Yes computer systems for which two subsystems were developed—the ASATIZ (Analysis of Morbidity, Traumatism, and Disability) and the LDP (Treatment and Diagnosis Process). Although the polyclinics have continued to use the Yes systems, they have also begun to use SM computers located right on the premises. They are thus able to compose statistical reports and thoroughly analyze the quality of the treatment and diagnostic activity in a real-time frame. A standardized system of describing a patient's status has been developed. The physician uses standardized programs and edits them on screen to fit the patient. This approach formalizes the description, facilitates its transfer to machine memory, and disciplines the physician by forcing him to research and analyze all elements of the examination. It also relieves the doctor of writing, as the computer stores the information and also prints a copy for the patient's file. Forms can also be printed up for the doctor to fill out, after which they are entered by an operator into the computer. The computers can be connected so that all doctors and specialists have access to the information. An accounting program for calculating employee wages has been developed. A systemic approach of creating separate mutually complementing subsystems has solved the problem of computerizing the polyclinic. References 5 (Russian)

UDC 616-006-036.4-07+616-006-084.3

**Objectives of the Oncology Service Tasks in Prevention and Early Diagnosis of Oncologic Diseases in Mass Health Screening System**

907C05014 Moscow ZDRAVOKHRANENIYE  
ROSSIYSKOY FEDERATSII in Russian No 11 Nov 89  
(manuscript submitted 5 May 88) pp 9-13

[Article by Ye. F. Stranadko, Moscow Scientific Research Oncology Institute imeni P. A. Gertsen]

[Abstract] Currently, secondary preventive measures—mass health screening and mass preventive examinations for the purpose of detecting precancerous conditions and cancer in its earliest stages—represent the most important aspect of the fight against cancer. Many problems exist in that area because of the absence of a standardized concept of how mass health screening and preventive examinations should be conducted, and only 11 percent of the individuals with cancer in the republic are detected with them. Treatment-and-prevention facilities do not use modern techniques in their preventive examinations. Many health care agency and facility directors do not oversee the organization and proper operation of consulting offices very carefully. Throughout the Russian Soviet Federated Socialist Republic, there is a disparity between the high numbers of preventive examinations conducted and the low rate of cancer detection. The examinations do use a differential approach that considers age, occupation, harmful habits, or sex. At the same time, the development of computer technology is providing an opportunity for identifying high-risk

groups who need follow-up examinations, for diagnosis, treatment, etc. The use of computers for screening the public makes it possible to increase the detection rate without increasing the number of medical personnel in the screening system. An automated screening system for detecting malignant neoplasms and precancerous and more widespread chronic diseases has been developed and put into operation. From 1983 through 1987, some 15,000 people provided their medical histories via computer. According to screening data, those at high risk for cancer constitute 12-18 percent. The detection rate of malignant neoplasms is 0.4 percent, or five- to tenfold higher than in other forms of preventive examinations. Premalignant diseases were detected in 4.8 percent of those screened, and the more widespread chronic diseases were found in 7.4 percent of the population. A formalized description of a normal photofluorograph has been created, and new techniques for analyzing images have been developed. The purpose of this invention was to create an automated system of dividing photofluorographs of the thoracic cavity into two groups suspect and normal. Automatic analysis detects up to 80 percent of the shadows missed by physicians. It was found that early active detection of disease is more profitable than letting disease go undetected. The advantage is twofold: less money is spent on treatment, and an active member of the collective capable of contributing to home and community is saved. The main emphasis must be on prevention and active early detection of malignant neoplasms and pre-cancer diseases.

UDC 618-084.3-036.8

**Effectiveness of Health Screening of Women by the Obstetrician-Gynecologist**

907C0501B Moscow ZDRAVOKHRANENIYE  
ROSSIYSKOY FEDERATSII in Russian No 11 Nov 89  
(manuscript submitted 21 Oct 88) pp 16-18

[Article by I. Ye. Rotkina, N. N. Vasil'yeva, and T. S. Sitko, Department of Obstetrics and Gynecology No 1 Novokuznetsk Institute of Postgraduate Medicine]

[Abstract] The activity of two women's clinics that serve about 90,000 women was studied. Both clinics are combined with a maternity hospital and serve 21 territorial districts. Two groups of indices were used to analyze the screening and its effectiveness. Indices that characterized the activity of the system were, among others, availability of outpatient observation, breadth of coverage of gynecology patients needing outpatient observation, timeliness of consultation, and average number of women seen by each doctor. Of the second group, which reflected changes in the health of the women, the researchers used the so-called index of screening effectiveness. Reports for 1982-1984 and 1985-1987 were included in the study. Women's need for health screening was assessed on the basis of morbidity identified during visits, primary morbidity, and frequency of illnesses detected during prophylactic examinations. In

spite of the intensified screening and other factors, the health of women in the territory being served have not improved. In order to conduct effective prophylactic work, the material-technical base of women's clinics needs to be improved, and more personnel are needed. Serious effective measures for improving the working conditions and daily life of women are also needed.

UDC 614.88:616-082.4-035.7

### Unnecessary Hospitalizations—A Flaw in the Organization of Emergency Treatment

907C0561A Moscow SOVETSKAYA MEDITSINA in Russian No 12, Dec 89 (manuscript received 17 Feb 89) pp 32-34

[Article by Yu. N. Shteyngardt, T. S. Ageyeva, T. N. Inzel, and L. I. Tyukalova, Department of Internal Diseases No. 2, Tomsk Medical Institute]

[Abstract] The work reported here consists of a quantitative assessment and analysis of the causes and nature of the inefficient operation of the emergency medical care system. The researchers studied the volume and nature of work performed in the emergency room of a municipal general hospital in terms of the emergency treatment rendered over a period of nine months (1 Jan through 1 Oct 1987) during nine weekend days a month, excluding planned hospitalization. During those after-hours periods, a total of 1,809 individuals were either referred to the hospital by polyclinics or brought in by the ambulance service, for an average of 22 per day. Only 40 percent needed emergency hospital care; 16 percent needed emergency outpatient care, 44 percent did not. The researchers estimate that the unnecessary referrals cost some 16,000 rubles a year. Most patients (28 percent) were sent to the hospital for supposed cases of pneumonia; 86 percent of them, however, did not need emergency medical care. Drunkenness was the second most frequent referral, and half of those patients had no complaints when they were brought in. Only 34 percent of them needed emergency treatment, and only 3 percent of them needed hospitalization. The analysis indicates that more than half the individuals who are referred or brought to hospitals are referred or brought in unnecessarily.

UDC 616-082.6.003.1

### Introduction of Economic Management Methods in Hospital Facilities

907C0561B Moscow SOVETSKAYA MEDITSINA in Russian No 12, Dec 89 (manuscript received 22 May 89) pp 34-37

[Article by V. N. Kozyrev, Psychiatric Hospital No 1 imeni P. P. Kashchenko]

[Abstract] One of the central tasks of perestroika is to implement economic incentives in such a manner that

the work of labor collectives improves as a result. Since January 1, 1988, an experiment on the introduction of economic management methods has been under way at the Moscow City Clinical Psychiatric Hospital No 1 imeni Kashchenko. Its ultimate aim is the development and introduction of a territorial model of psychiatric service based on the unified activity of hospital and nonhospital components. The first stage of the experiment demonstrated that the operation of a budget-funded medical facility can be altered through the use of economic incentive. In the process, the organizational principles, forms, and methods of labor must be changed; in place must be a new system of management, a great deal of preparatory, systematic explanatory work in the collective, and informal use of the principles of glasnost and collective decision-making. The Kashchenko hospital was first reorganized along the district-territorial principle for the profiling of departments, which made it possible to set up various specialized departments. Data are presented on the results of the study and compared with 1986 data. The number of hospital patients decreased 11 percent from 1986 to 1988, as only those people with the more serious illnesses were hospitalized. The average length of hospitalization among the patients living in the administrative zone of the hospital decreased by 17 percent. The index of repeat admission to the hospital decreased by 11 percent, while the length of time between hospitalizations increased by 13 percent. Positive changes have been observed in social rehabilitation work. The introduction of economic incentives stimulates in people a material and moral interest in work. During the year of operating under the new conditions, an understanding of the operating principles of a territorial model of organizing psychiatric service and firm conviction of the need for its practical realization developed.

### Dynamics of Morbidity Among Children Two Years Old or Under in Rural Areas

907C0564A Frunze ZDRAVOKHRANENIYI KIRGIZII in Russian No 6, Nov-Dec 89 pp 26-29

[Article by N. G. Ivanenko, Kirgiz Scientific Research Institute of Obstetrics and Pediatrics]

[Abstract] The level and structure of morbidity among rural children two years of age or under were researched. Continuous observation was conducted on 1,232 infants born in 1985 to permanent inhabitants of the Sokuluk-skiy Rayon, 43 percent of which were Russian and 36 percent of which were Kirgiz. The infants were examined every six months from birth to two years of age. Various morbidity characteristics indicate a level of health for infants that is lower than in the European part of the country. Diseases occur more frequently in the first year of life than in the second. Prophylactic aid needs to be given to two-year-old children as a result of prevalence of pathological conditions. A nutritional, balanced diet is a good way to strengthen the children's health during their first years of life.

UDC 616.9-036.2-084+614.3+33

**Determining the Socioeconomic Significance of Infectious Diseases in an Administrative Rayon**  
907C0564B *Kishinev ZDRAVOOKHRANENIYE*  
in Russian No 6, Nov-Dec 89 (manuscript received  
24 May 89) pp 9-11

[Article by M. A. Barabash, G. N. Obrezha, S. V. Kovaliu, I. F. Chebotar, T. Ye. Myneskurte, E. P. Baybarak, and S. I. Botezatu, Department of Epidemiology, Kishinev Medical Institute; Sanitary-Epidemiological Stations of the Lenin and Oktyabre rayons, Kishinev]

[Abstract] Substantiation of the focus of epidemic-control efforts and resources in high-priority areas that are crucial to the protection of public health is needed if epidemiological centers are to be opened. That would enable more effective planning of prophylactic and epidemic-control work. Socioeconomic analysis has been used in recent years to calculate the social and economic damage from infectious diseases and to improve administrative decisions about prophylaxis. Calculation of the socioeconomic significance of infectious diseases that are recorded in an administrative territory must become part of the analytic activity of the epidemiologist. Materials on the calculation of the socioeconomic significance of infectious diseases are presented for 1985-1988 for two districts of Kishinev. The average annual economic cost of the infectious diseases recorded in those regions was more than 13 million rubles, mainly the result of acute respiratory infections and influenza. Using the epidemiological station results for calculating the socioeconomic significance of infectious diseases recorded in an administrative territory will help to increase the effectiveness of prophylactic and epidemic-control measures, to sensibly use the financial resources allocated for those purposes, and to prevent social and economic damage from the occurrence and spread of infectious diseases.

UDC 618.39-021.3-055.5/7-02-07

**Resolving Feasibilities of Retrospective Methods of Calculating Miscarriages in Genetic Monitoring System**

907C0567 *Moscow GIGIYENA I SANITARIYA*  
in Russian No 12, Dec 89 (manuscript received  
14 Dec 88) pp 50-53

[Article by M. V. Tikhopoy, I. N. Lunga, and I. V. Nikolayeva, Medical Genetics Institute of the USSR Academy of Medical Sciences]

[Abstract] One approach to genetic monitoring is to study spontaneous abortions in human populations exposed to various adverse environmental factors. The work reported here involved a study of a retrospective method of ascertaining the number of spontaneous abortions—analysis of medical documents and development of procedures for using that method for studying the level of the mutation process. Data were collected from two women's clinics in Moscow from 1976 through 1984 on 21,843 pregnancies with 1,036 miscarriages. In one of the women's clinics, all of the individual charts for the women were studied, revealing an additional 222 miscarriages. It was shown that using the pregnancy histories as a source of information leads to artificially lowered assessments of the miscarriage frequencies. The main purpose of genetic monitoring is to trace a change in the level of the mutation process. Miscarriages are conveniently used as an index that indirectly characterizes that process. Most embryos with mutations are spontaneously aborted very early in the pregnancy. Before the twelfth week of gestation, 30 percent of miscarriages are due to various genetic problems. Only 3.5 percent of miscarriages occur in the 28-30th weeks of gestation. The frequency of spontaneous abortions in analysis of the primary documentation of the women's clinics—11.47 per 100 pregnancies—is close to that of data cited in the literature. References 11: 5 Russian, 6 Western.

UDC 612.017:578.8]-036.22-078.7(476)

**Biological Properties of AIDS Virus Isolated  
From Inhabitant of BSSR**

907C0498A Minsk ZDRAVOOKHRANENIYE  
BELORUSSII in Russian No 11, Nov 89 (manuscript  
received 5 Jul 89) pp 11-12

[Article by P. G. Rytik, G. van der Groyen, V. F. Yeremin, N. D. Kolomiyets, S. A. Popov, P. Nis, V. Villems, G. Verkauteren, Yu. G. Ilkevich, and N. N. Lemeshko, Belorussian Scientific Research Institute of Epidemiology and Microbiology; Prince Leopold Tropical Medicine Institute (Belgium)]

[Abstract] Results of joint studies by the Belorussian Scientific Research Institute of Epidemiology and Microbiology and the Prince Leopold Tropical Medicine Institute are presented. A young Belorussian woman who had signs of lymphadenopathy was serologically tested, and it was found that she had recently been infected with HIV through sexual contact with a student from Africa. The student was subsequently expelled from the USSR. Lymphocytes in the peripheral blood were the source of the infection. They were isolated and cultured. Non-infected cells were added to the culture, and two weeks later, the HIV antigen was found in it. The HIV strain is highly reproductive. Its nucleotide sequence is being studied. It has proteins typical of HIV-1 and has been named HIV-1<sub>2</sub>.

UDC 595.142.35:535.379

**Luminescing Soil Enchytreids (Oligochaeta, Enchytraeidae)**

907C0431C Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 310 No 2, Jan 90 pp 496-498

[Article by N. T. Zalesskaya, V. N. Petushkov and N. S. Rodionova, Institute of Evolutionary Animal Morphology and Ecology imeni A. N. Severtsov, USSR Academy of Sciences, Moscow; Institute of Biophysics, Siberian Department, USSR Academy of Sciences, Krasnoyarsk]

[Abstract] Three of the 16 families of *Oligochaeta* (*Enchytraeidae*, *Lumbricidae* and *Megascolecidae*) have luminescing species. The authors know of no studies of bioluminescence of *Enchytraeidae*; none have been conducted in the USSR. Earthworms were collected in the vicinity of Krasnoyarsk, along the Kach River and at a biological station of Krasnoyarsk University from June to October. Soil samples were taken from under leaf fall to a depth of about 10 cm, and worms were extracted by water funnels by the O'Connor method. A bioluminometer recording of luminescence showed that nearly 20 percent of the worms, including young and mature worms, were luminescing. The researchers classified many of the luminescing worms as part of a group of *r. Fridericia* species, the spermatheca of which is a pyriform ampulla with two elongated diverticulae, directed toward the enthalpic part of the ampulla. Such spermathecae are found in *alata*, *sylvatica* and *conculata* species. A distinguishing trait of the new species, tentatively named *Friaericia heliota*, is the number of setae in the lateral fascicles 0-1; frequently there are no setae on the anterior 20-23 segments. *Fridericia heliota* sp. n., Zalesskaja was described briefly. Another group of luminescing enchytreids is the variant *Fridericia ratzeli* Eisen. *Fridericia heliota* sp. n. form has fewer setae in the fascicles and it produces a constant, bright luminescence, readily visible to the eye adapted to darkness; while *F. ratzeli* shines dimly after tactile stimulus, and only after stimulation (an electrical discharge) does it give a short (5 min<sup>-1</sup>) flash. The nature of the bioluminescent signal

may serve as a systematic sign. The source of luminescence is found in the region of the pigmented, or cuticular, glandular cells of these worms. There are more of these cells on the back side of the body of the worm and the luminescing points are located here. The number of rows of cells in each *F. ratzeli* segment is twice that in *F. heliota* sp. n.. The same differences are seen on lumographs. Figure 1: references 14: 1 Russian; 13 Western.

UDC 577.3.04

**Remote Influence by a Human on a Population of Mobile Cells**

907C0532 Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR: SERIYA B—GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 2, Feb 90 (manuscript received 18 Jul 89) pp 58-61

[Article by A. I. Karachentseva and Yu. N. Levchuk, Ad Hoc Scientific Collective "Otklik" [Response], Institute of Biochemistry, UkrSSR Academy of Sciences]

[Abstract] A human's ability to influence other individuals without using traditional means of signal exchange is unquestionable. However, we cannot point with certainty to the physical substance that is the vehicle for that influence until equipment capable of reading the human biological field is invented. In earlier reports, the researchers here demonstrated that a suspension of *Dunaliella viridis* alga cells can be used as a sensor of the human biological field. The response of the population to human influence was assessed from the change in the stochastic movement of the cells, which was measured with laser correlation spectroscopy. In the work reported here, the researchers also used *Escherichia coli* and *Proteus vulgaris* bacteria, which, they report, also responded to the human biological field. They found that one out of 10 test subjects were capable of effecting movement in the microorganisms. The experiments were set up in such a manner as to exclude factors such as heat, electrostatic charge, and moisture from the palms of the hand above the cell suspension container. The researchers did not conjecture on the physical substance that transmits the influence of the human biological field, but they concluded that it is not associated with heat. Figures 4, references 8: 7 Russian, 1 Western.

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